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ABSTRACT

A study focused on those factors that typically characterize television viewing--those ground rules for processing that are relatively immutable and those that vary in accordance with situation and contextual cues within the environment. Sixty fifth grade students were randomly assigned to one of four treatment groups. Members of all four groups viewed a television program and responded to an open-ended interview following viewing. Treatment groups were based on the manipulation of frame of reference of viewing set (either educational or entertaining), and viewing mode (either stopping or no-stopping). The question was whether subjects motivated by educational instructions or the stopping mode of viewing would invest more mental effort and deeper processing by attempting to put the pieces together so that they were integrated into the story line, thus reducing the uncertainty resulting from the interruptions of the narrative flow. Such behavior would permit them to reformulate their hypotheses about what was happening in the show, their expectations about what was coming next, and what it all meant in the face of the content that appeared to be rather disjointed. Results suggested that viewing to learn or mode of viewing (stopping) altered students' routine television viewing schema and called for more mental effort than usual. The additional effort resulted in consistently deeper or higher levels of processing. Something in the context of the event or something about the event itself triggered the need for more attention and higher levels of processing. (HOD)

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The systematic viewer: A developmental inquiry
into the existence of a television schema
in children

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Introduction

"Tune in tomorrow for another exciting episode of...." For the soap opera addict, this phrase signifies another bittersweet parting. But even those television viewers who are not soap devotees could easily identify the type of program that closes with such a kicker, as well as the time of day when it would be likely to appear and the general content of the series. Recently, media scholars (c.f. Hirsch, 1977; Newcomb, 1974) have suggested that America's television viewers of all ages are becoming increasingly sophisticated in their understanding of the medium--its symbol system, genre, content, structure, and flow--just as previous generations gradually learned to understand complex systems, including human speech, the alphabet, paintings, sculpture, printed material, theater, photography, film, radio, and so on.

The notion of understanding television, as it is used here, is similar to Chomsky's (1965) concept of grammar in that it refers to the individual's competence, his or her ability to distinguish between those presentations which are acceptable and those which are unacceptable, according to the rules of the system. The tacitly known set of rules governing the system, whether the system is a language, a literary genre, or a mass medium, defines and identifies it as a unique and independent mode for its users.

Creating new terms for the concept, theorists in a

number of fields have adopted Chomsky's basic notion of grammar in conducting wide-ranging research extending beyond the realm of linguistic behavior. A noteworthy example recently contributed to the field of literary analysis is Rabkin's The Fantastic in Literature (1976). In his efforts to characterize "the fantastic," Rabkin stated:

The ability of art to create its own interior set of ground rules is fundamental to the aesthetic experience...but which more generally falls under the term "decorum." Every work of art sets up its own ground rules. The perspectives that the fantastic contradicts are perspectives legitimized by these internal ground rules (Rabkin, 1976, pp. 4-5).

Rabkin discussed readers' expectations as they approach fantastic or escape literature based on the tacit ground rules known to them through previous experience with the genre, resulting in increasingly elaborated expectations. Over the past 200 years writers have manipulated these basic rules, experimenting with and developing them and, in turn, constantly refining the readers' expectations. Rabkin is not the first to point out the notion of basic ground rules for a particular literary genre. Rather, he has attempted to do for the fantastic in great detail what Coleridge tried to do for poetry when he explained the requisite "willing suspension of disbelief" to the student of poetry (Coleridge, Biographia Literaria, Chapter 14).

Thus, interests in concepts like ground rules and grammar are not entirely new to scholars. But there is certainly evidence of renewed enthusiasm in their potential usefulness in research, particularly in the social sciences.

Studies based on schema theory, for example, share important assumptions with Chomsky's work on grammar and Rabkin's specification of internal ground rules about the way in which the individual encounters and makes sense of the world. The schema orientation has inspired prolific research efforts among social and cognitive psychologists (Cantor & Mischel, 1979; Markus, 1977), anthropologists (Rice, 1980), and discourse analysts (Freedle, 1979). Moreover, numerous social scientists have conducted what is essentially schema research but have re-named and slightly modified it, creating such concepts as Schank and Abelson's scripting (1977) and Goffman's frame analysis (1974).

The following overview offers important theoretical insights and methods for applying schema theory to media research and for exploring the notion of viewers' tacit understanding of the mass media. The foundations of these research efforts developed from two distinct sources 1) schema theory as it was spelled out by Bartlett (1932), and 2) linguistic theory based on the concept of transformational rules which define the deep and surface structures of phrases (Foss & Hakes, 1978).

The similarities between these two research traditions are quite striking in terms of substantive issues; their main difference lies in what they choose to analyze--the primary unit of analysis. The former tended to adopt a much broader unit of analysis, attempting to deal with context and expectations surrounding the particular event of

interest, while the latter tended to focus on individual sentences or utterances or a very short and simple narrative. However, as research in the two areas developed, such distinctions became less clear. Today many researchers incorporate methods and concepts from both (Freedle, 1979).

One especially stimulating area of linguistic research, which grew out of the transformational work, is referred to as the "click" methodology (Fodor & Bever, 1965). This methodology is based on a technique intended to monitor the "chunking" behavior of the subject.

In the classic click study a subject listened to a series of utterances which were interrupted at various points by extraneous click sounds. The expected effect, according to transformational rules, was that the listener would report the location of the click as a function of major syntactic breaks. Thus, reports of clicks would migrate from their actual location to breaks in the syntax or in the chunks of the utterance. These early studies led to claims that the click methodology provided evidence that subjects relied on underlying structure rather than surface structure for processing utterances (Bever, Lackner, & Kirk, 1969).

It is the issue of chunking or unitizing, the process of the receiver defining bits of information from the presentation, which ties the research in transformational grammar to schema research on the perceptions of human behavior and on the comprehension of discourse and

narrative. Studies investigating the perception of human behavior (Cohen & Ebbesen, 1979; Newton, Engquist, & Bois, 1977) have consistently reported that actions are defined or unitized as a function of one's prior knowledge about the behavior, or the frame of reference with which one approaches the situation. Unitizing is measured by simply asking subjects to indicate when they feel that an action or unit has been completed. Cohen and Ebbesen summarized the process of unitizing behavior as follows:

First, adopting a schema framework provides a theoretical language for describing how observers' goals influence their processing of the stream of behavior. It is assumed that an individual's knowledge about human behavior is organized into schemata and that this knowledge includes information about task-related actions and personality-related behavior. The observer's attention, interpretation, and memory for the information contained in the stream of behavior may be influenced by these cognitive schemata (Cohen & Ebbesen, 1979, pp. 326-7).

Similar work on the comprehension of stories is based on the concept of a narration schema. According to Kintsch (1974), the reader or listener processes a story as a series of episodes or propositions. His narration schema helps him discern which information is particularly important, such as plot, setting, characterization, and which is less crucial to understanding the story and need not be thoroughly integrated. These expectations guide one's processing of prose information so that the reader knows from experience that there are certain slots of information which must be filled in order to understand the story.

Only recently have developmental and cognitive

psychologists (cf. Collins, Wellman, Keniston, & Westby, 1978) begun to examine youthful audience expectations regarding a particular medium. Rather than searching for direct and identifiable cognitive and behavioral media effects resulting from exposure to media content, this approach is characterized by a focus on the information processing aspects of media consumption.

Work by Collins et al. exemplifies the information-processing based approach. They discussed the process of schema-based comprehension as follows:

Although a complete account of the cognitive activities necessary for understanding a televised plot is not possible at this time, it seems likely that mature comprehension involves at least three tasks or phases. First, the viewer selects essential pieces of information from the presentation, ignoring or paying less attention to extraneous detail. Second, those essential scenes or actions are ordered according to some scheme. Third, the viewer makes certain inferences that go beyond what has been presented in the stimulus (Collins et al., 1978, p. 389).

In their work Collins et al. (1978) manipulated temporal versus random organization and plot-essential, as opposed to nonessential, information in studying the television schema of second, fifth, and eighth graders. Subjects' comprehension of plot increased significantly between the second and fifth grade, particularly in their ability to distinguish between central and peripheral content. The study also demonstrated that all subjects, regardless of grade level, exercised some sort of organization strategy for comprehending the content. Those who viewed the jumbled version scored consistently lower

than those who were exposed to the temporal presentation.

These findings demonstrated the presence of a probable strategy for organizing the television experience even at the second grade level. By the fifth grade, most television viewers have become masters of the task; tacit knowledge or understanding of the medium's rules has been achieved by the 10-year-olds of American society.

Little is known however about the process used by the child in identifying the schematic elements. Especially little is known about the possible role of perceptual set in determining the meaning that the child attaches to the processing experience. Does this meaning affect processing - are units or chunks perceived as more integrated and meaningful - in some situations and not in others?

For example, Salomon (1981b) has noted the effect of expectation on amount of cognitive energy invested in particular tasks, what he refers to as perceived demand characteristics, which determine the amount of invested mental effort. He has repeatedly suggested that American viewers typically perceive of television viewing as being "easy" or "shallow" and therefore requiring little or no effort. The question here is whether this perception, and subsequent effects on cognition may be altered by manipulating the viewer's expectations, that is, the goal or reason for viewing. If perceived demand characteristics affect the depth and nature of information processing behavior, then differences in encoding behavior while

viewing and reconstructing through recall measures should appear between the entertaining and educational treatment groups. Their amount of invested mental effort (Salomon, 1981a) should vary as a function of the perceived task.

The study discussed here assumes the existence and use of a television narrative schema which respondents bring to the viewing situation, a tacit understanding of the medium's rules. Measurements were devised to monitor both the encoding and decoding of the content. Measures were designed at two levels. Those at one level assess simple recall and chunking of material presented, and are not concerned with measuring subject understanding of such material. Measures at a second level are aimed at what children do with these bits of recall data - the sense and meaning they attach to them, the elaborations they perform on the material to fully comprehend the messages, especially the abstract messages. Of particular interest here are those factors which typically characterize television viewing, that is those ground rules for processing that are relatively immutable, and those which vary in accordance with situational and contextual cues within the environment.

Method

Subjects.

Sixty fifth graders from a rural public school in Michigan participated in the study. Each was randomly assigned to one of four treatment groups. Members of all four groups viewed a television program and responded to an

open-ended interview following viewing. Treatment groups were based on the manipulation of frame of reference or viewing set (either educational or entertaining), and viewing mode (either stopping or no-stopping).

Conditions.

Viewing set. This manipulation was designed to examine possible differences in viewing behavior which might occur as a function of task perception (Cohen & Ebbesen, 1979) or perceived demand characteristics (Salomon, 1981a). It was hypothesized that those who were told that the show was educational would behave differently from those who were told that it was a pilot produced for network television designed to be viewed at home to entertain children their age.

The educational context should enhance more active viewing, more invested effort, more elaborations, and inferences, while the entertainment context should facilitate viewing at a more superficial level of meaning.

Viewing mode. Stopping and no-stopping modes were designed to monitor processing as it occurred, as well as to distinguish between a cognitively "active" and "passive" viewing mode. Half of the children in each viewing set were shown how to stop the videotape in order to control its pace, enhancing viewer involvement and activity. Ability to stop the tape at self-selected points was intended to provide data on the chunking of the content that was taking place and the amount of effort subjects were investing in

viewing.

Procedure

Thus subjects in two treatment groups were told that the program was intended to be shown on commercial television to entertain children their age. The purpose of viewing it, as we explained to them, was to find out how they would compare it to other programs they watched at home after school and whether they thought other children would like it. One of these two groups was shown how to stop the tape to control the pace of the presentation, make a comment, ask a question, and so on, if they wished to do so. Each time the child stopped the tape, the interviewer recorded the exact temporal placement of the stop. Only 17 respondents (57 percent) given control over the pace of the program chose to exercise it by stopping the tape at self-selected points.

Respondents in the other group receiving the entertainment instructions were not given the chance of stopping the videotape; they were simply told that they would be asked to evaluate the program following viewing. The purpose of this group was to experimentally create and/or encourage the processing mode most similar to naturalistic viewing behavior. Performance of these subjects served as a baseline, with their only explicit concern being whether or not they liked the program. They were not encouraged in any way by the experimenter to work at processing the content beyond the way they typically

viewed network television at home.

The remaining two groups were given educational instructions. They were told that the program was intended to teach them and that they should try to learn something from it in order to answer questions about it following viewing. They were instructed to look for important parts and to try to remember them.

Again, respondents in one of these treatment groups did not have access to the remote pause to stop the videotape. Rather, they were simply given the educational instructions to pay close attention and try to learn from the program. Data from this group permit examination of the differential effects of the stopping behavior, as opposed to the educational frame of reference.

The final group was shown how to stop the tape (and placement of stops was again automatically recorded during viewing). This experimental group was designed to encourage the greatest amount of invested mental effort, the most active processing mode possible. If students are told that something is educational and intended to teach them and that they will be tested on it, they will probably be more attentive in order to answer questions later. In addition, if they are given some control over the pace of the program, the probability of more active or deeper processing is enhanced. Thus, the combined effects of both experimental manipulations (viewing set and viewing mode) for respondents in the fourth group should result in the most intense

processing mode of all the treatments.

Because we hypothesized that the pause mechanism would alter naturalistic behavior, the two non-stopping groups were included to provide data on straightforward viewing differences as a function of task perception, or viewing set. At the conclusion of the program all subjects responded to an identical battery of measures relating to program content and evaluation.

Program

Stimulus material consisted of a brief (4-minute) pilot tape to acquaint all subjects with the type of content, to allow them to adjust to the viewing situation, and to encourage stopping subjects to practice with the remote pause control. The viewing of the pilot was followed by exposure to a fifteen-minute episode from the educational series Thinkabout.

This series, designed to teach basic problem solving skills, presents live actors in fairly realistic situations and provides insights about the world and its inhabitants without the usual overt didacticism of traditional educational programming. This stimulus was chosen because it could easily be considered educational or entertaining, depending upon one's frame of reference or expectations. The program plot dealt with the changing perceptions of the purpose and glory of war, from the perspective of an American soldier taking part in the battle. Two girls playing in a yard find a box of old letters under a shed.

They begin to read the letters, written by the soldier to the girls' great-grandmother. While the letters start out bravely, describing the war as a thrilling adventure and his participation as a glorious honor, it soon becomes clear that the soldier is affected by the pain, suffering, and essential meaninglessness of conflict. The program is a mixture of scenes presenting dialogue between the girls, and flashbacks of the soldier at war. Its educational value is as a trigger film, teaching children the complexity of assigning meaning and intent to written material.

The program was slightly modified by editing into the narrative flow a series of seven interrupting segments about five seconds in length. These segments were taken from a subplot of the program and randomly assigned to high attention points and low attention points.³

The jumbling was based upon a model of cognitive processing proposed by Powers (1973). Powers has suggested that individuals proceed to higher levels of cognition only when they encounter uncertainty and their hypotheses about what is happening are violated. We confused the sequence of the program by editing a jumbled subplot into it, forcing uncertainty, which might easily be overlooked by a viewer

³Placement of these segments (high and low attentions points) was determined after considering both the formal features of the presentation (Wright & Huston-Stein, 1979) and the content. The former relied on identification of production and editing techniques, such as pans, cuts, and so on, while the latter addressed the variance in level of action, number of actors present, and dynamic, as opposed to static, scenes.

expending less effort, upon the attentive viewer.

The question here was whether subjects motivated by educational instructions and/or the stopping mode of viewing would invest more mental effort and deeper processing by attempting to put the pieces together so that they were integrated into the story line, thus reducing the uncertainty resulting from the interruptions of the narrative flow. Such behavior would permit them to reformulate their hypotheses about what was happening in the show, their expectations about what was coming next, and what it all meant in the face of content which appeared to be rather disjointed.

Measures

The criterion variables of interest here relate to the processing or encoding of television content in terms of general recall and unitizing or chunking, comprehension, and elaboration or depth of processing.

General recall and chunking. Indicators of the individual's organization of television content were developed from content analyses of subjects' reconstructions of the story presented on the videotape. Subjects were asked to re-tell what happened in the program in their own words. These reconstructions were scored for: length, number of scenes, and number of action-units or narrative elements.³ In addition, subjects responded to a brief

³Action-units or narrative elements were defined as

series of content questions relating to specific details in the program. Their answers were scored as correct or incorrect and a total quiz index was constructed from these data.

Comprehension. Assessments of comprehension were based upon the completion of a sequencing task. Subjects were asked to sort still photos of events in the program into the order in which they occurred. Children had been timed while they performed the task; thus each received a duration score (in seconds) and an accuracy score on the sequencing task.*

Elaboration and inferences. Four measurements were constructed to assess subjects' level of processing of the content and invested mental effort (Salomon, 1981a). Reconstructions of the content and of the characters were coded on two scales -- plot and character. The ordinal scales were constructed as follows:

Reconstructions of plot

1. arbitrary details
2. minimal outline
3. detailed plot outline
4. abstract analysis³

either an actor-action-object phrase or as a state of being. An example of the former would be, "There were letters and stuff in the box," while the latter is illustrated by such items as, "There were these two girls."

*A perfect score of 14 would indicate that all photographs appeared in the proper sequence. However, for every picture out of adjacent sequence, the subject lost one point. Therefore, the formula for calculating the sorting score was as follows: Sorting score = 13 minus the total number of photos out of sequence.

*An example of an entire plot reconstruction characterized as arbitrary details was: "They found a tin

Reconstructions of character components

1. physical and/or action description
2. analysis and interpretation'

Higher levels on these scales indicated more elaboration and abstraction, hence greater investments of mental effort on the part of the viewer. In addition, reconstructions were coded for number of inferences viewers included in open-ended reconstructions of the stimulus.

Finally, the interviews were scored for total number of spontaneous references to the outside world - generalizations from the program content to subjects' own lives or comparisons with their own experiences, and number of analytic statements - where they mentioned a level of abstract interpretation regarding the meaning of the program. We assumed respondents with more of these observations worked harder at understanding and thinking about the meaning and implications of the content for themselves.

The measures were intended to provide an estimate of subjects' depth of processing and invested mental effort.

box. And all this stuff was in it." One coded as abstract analysis was: "Well, they found a piece of family heritage. Like, it was a guy who learned what war was really like, in World War I."

'Examples of character reconstructions considered physical and/or action description was: "She's wearing glasses," while an analytical example was: "Well, if my logic is right, and because of this certain sequence that all T.V. shows for, like, kids and comedy shows have, or something, the smart person of the show will always be wearing glasses. So she was probably very smart. And I could tell by the way she thought that she was very smart."

In all cases the experimental subjects (educational and stopping treatments) were expected to "work harder" and proceed to deeper levels of processing than the control subjects (entertaining no-stopping group). The educational stopping group, in particular, was hypothesized to score significantly higher on all dependent measures than the control group.

Results

The analyses attempted to assess effects of experimental viewing set (specifically, educational) and viewing mode (specifically, stopping) from baseline behavior within the control group (entertaining no-stopping). Our interests focus on what features of processing behavior are most affected by the respondent's perception of the task or viewing set and viewing mode, and what features remain relatively constant, regardless of contextual factors.

General recall and chunking measures. Two-way analyses of variance were conducted on each unitizing measure: length in words, number of scenes, and number of action units. Factors in the 2 x 2 design were viewing set and viewing mode.

Initial examination of the plot reconstruction results, typical of television recall and learning measures, suggests little significant difference between treatment groups. Means are presented in Table 1.

 Insert Table 1 here

No main effects for either viewing set or viewing mode were evident in the analyses; the interaction between the two independent variables was marginally significant for scene-recall only, $F(1,56)=3.02$, $p<.09$.

Table 2 presents a list of the units most frequently mentioned by children in each of the four groups.

 Insert Table 2 here

Comprehension and elaboration measures. Consistent patterns of differences begin to emerge, however, as the analyses proceed to dependent variables which address issues of depth of processing, or effort and energy invested. Two-way analyses of variance were conducted on the dependent measures: number of independent story elements mentioned in the reconstruction task, number of inferences, number of generalizations to the real world ("she's like my mother"), number of analytical statements ("the show's about war and changing feelings"), the accuracy and time scores on the sequencing task, and the plot and character reconstructions. However since both the plot and character reconstruction scores were ordinal in nature, a non-parametric technique was employed to analyze these measures. One-way Kruskal-Wallis analyses of variance were conducted, using viewing

set and viewing mode as separate independent variables.

For the two-way analyses, significant effects were obtained for viewing set on sorting time, $F(1,56) = 3.98$, $p < .05$, and number of analytic statements, $F(1,56) = 3.55$, $p = .06$. No significant main effects were observed due to viewing mode. An interaction was apparent on the sorting time measure, $F(1,56) = 4.17$, $p < .05$. All main effects indicated that subjects who received the educational instructions performed better than did those who viewed for entertainment. The interaction suggests that there were no mean differences in time for subjects who stopped the tape, independent of viewing set. However, for children who could not stop the tape, educational instructions led to significantly longer times. These children also performed best in terms of accuracy. No other main or interaction effects were significant, although examination of the tabular means suggests that the effects of viewing set were quite consistent for most of the measures.

For the ordinal analyses, significant effects were again obtained for viewing set but not viewing mode. This was apparent especially for the plot reconstruction measure, $H = 5.36$, $p < .05$; again, children who were "learning" did better than those who were "being entertained." Scores for character reconstruction were in the hypothesized direction, but were not significant. These findings, when considered in conjunction with consistent directional trends among the other depth of processing dependent variables, suggest that

the perceived demand characteristics and the consequent effort exerted in encoding differs between the educational and entertaining viewing set groups. Though not all of these analyses approach statistical significance, the pattern, when taken as a whole, is remarkably consistent. Table 3 illustrates the general trend of lower scores, and thus more shallow processing, for subjects instructed to enjoy the show, and higher scores or deeper processing for subjects instructed to learn from the stimulus.

 Insert Table 3 here

Thus, the least mental effort appears to have been expended by respondents in the no-stop entertainment group; their scores are consistently low on all of the dependent measures relating to depth of processing, regardless of the significance level of the test. In all of the analyses but one (references to the real world) the pattern is clear. The entertaining viewing set groups score at consistently lower levels than the educational groups; their processing is more shallow. The only exception to this trend occurs in the analysis of real world references, where the importance of the stopping viewing mode, giving respondents time to relate the content to their own lives, overpowers the effect of the educational viewing set. Still, the lowest group mean for real world references appears for the control group and the highest for the educational stopping respondents.

Respondents in the educational stopping treatment, whose routine behavior was altered for both viewing set and viewing mode, are consistently the highest on the criterion variables. The pattern of the scores on the dependent measures between the control and the educational stopping groups, one responding to no experimental manipulations (neither educational viewing set nor stopping viewing mode), and the other responding to both, is quite consistent and dramatic.

Discussion

The general directions of the findings presented above support and expand upon several areas of current interest in television research. Certainly there is evidence of an organizational strategy which subjects bring to the viewing situation, strong evidence of a television schema or tacit understanding of the medium's grammar, among the fifth graders involved in the study. Furthermore, traditional but rather superficial mass media measures of recall, such as number of scenes reconstructed or length of recall, fail to demonstrate much variance in the television schema in response to both viewing set or instructions and viewing mode. Rather, these measures reflect the constant features of the schema. The content appears to be encoded quite similarly by all subjects. Reconstructions of the plot across all treatments are similar in length and rely on the same basic scenes, actions, and feelings, which are recalled because of their special salience determined by one's

television schema. The organization of the content on this superficial but systematic level relies on the internal ground rules of the television schema; hence the similarities on the criterion variables between the control and the three experimental groups. All subjects demonstrate the minimal level of literacy (Salomon, 1981b), a general level of competence in understanding the grammar of the medium.

The subtler reconstruction measures, however, suggest an alternative explanation of what happened while the subjects watched the videotape. Subjects who were assigned to the experimental treatments consistently displayed more mental effort in encoding and reconstructing the program. They recalled more elements and action units, which differ from scenes in being more finely tuned indicators of plot development. It appears that according to the television schema, scenes are a primary unit of encoding; that is for all subjects the scene determined the context for the actions that occurred within it. Elements, however, were not encoded and reconstructed independently unless the viewing experience was altered in some way to increase the mental effort invested in watching the program (see Appendix A).

Further evidence of the increase in the energy exerted by subjects is found in the levels of abstraction in the reconstructions of the plot and main characters. Again, altering the expectations via instructions, or the viewing

mode via the stopping mechanism, changed the subject's behavior. The television schema still played its role in organizing the content into a meaningful whole, but the viewing experience became a more "active" process (see Appendix B).

Schema theorists often cite examples of this sort of phenomenon. What is typically a routine experience suddenly is charged with greater significance, and thus demands more of the individual's attention. Powers' (1973) explication of perception is helpful in grasping this point. According to Powers, perception operates as a "hierarchical structure of feedback control organizations" (1973, p.78). The process of perception works to maintain a homeostatic relationship between our behavior in response to what is happening around us and the sensory information from the environment which we are constantly processing. The two must be in accordance in order to maintain homeostasis and permit us to understand the event in question. If our assumptions about what is happening are violated by error signals, that is information that does not fit our working hypothesis, then we move to a higher level of processing to reorganize our perception by formulating new hypotheses about what is happening. Thus, perception requires both top-down and bottom-up processing.

This is essentially what happened when the experimental subjects viewed the program. Cues from the environment clearly suggested that their goals for viewing (to learn) or

their mode of viewing (stopping) altered their routine television viewing schema and called for more mental effort than usual. The additional effort resulted in consistently deeper or higher levels of processing, as Powers (1973) proposed. Something in the context of the event or something about the event itself triggered the need for more attention and higher levels of processing.

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Table 1

Means of general recall measures

Dependent Variables	Viewing set and mode			
	Entertain		Educate	
	No stop	Stop	No stop	Stop
Words	148	117	174	145
Scenes	3.88	3.27	3.14	4.00
Actions	15.68	9.40	10.75	8.49
Quiz	4.00	4.20	4.29	4.17

Table 2

Schematic units mentioned by participants, in percentages

Scene unit	Viewing set and mode			
	Entertain		Educate	
	No stop	Stop	No stop	Stop
Lose ball	81.3	78.6	93.3	93.3
Find letters	81.3	92.9	100.0	86.7
Mom finds letter	81.3	71.4	93.3	86.7

Table 3

Means for grammar and comprehension measures*

Dependent Variables	Viewing set and mode			
	Entertain		Educate	
	No stop	Stop	No stop	Stop
Elements recalled	6.69	6.47	8.14	7.33
Inferences	1.88	1.87	2.43	2.00
Real world references	2.50	3.27	2.79	4.13
Analytical statements*	1.25	1.06	1.57	1.53
Sorting accuracy	7.13	7.93	8.29	8.47
Sorting time*	218.25	239.53	298.00	247.73
Plot construction*	2.69	2.60	3.14	3.40
Character construction				
Diane	2.81	3.00	3.00	3.73
Kathy	2.88	3.07	3.21	3.73

*p<.05

Appendix A

Several examples are presented here to demonstrate the differences between the control and experimental groups on these dimensions. All of the following reconstructions mention three scenes; however, the number of action units for the experimental subject sums to 11, whereas the two control subjects' reconstructions include 5 and 6, respectively.

Control subject: "They were playing ball, and they threw the ball. The one little girl was in back and they found a chest with some stuff, with letters and stuff in it. They took it upstairs, and they were looking at it and everything. They took it into the house. They were looking at everything and they found maps and then the letters and everything. And the last time they found a medal that was in the letter. That was it."

Control subject: "Well, these girls were playing catch, and the baseball went under the barn. They went to get it, and the girls found a box. And they looked all through it, and there was a whole bunch of letters, and they thought that it was their grandpa. They were guessing like if he was afraid or not afraid. If that one girl was his girlfriend or not."

Experimental subject: "Okay. There was two girls. And one girl was acting like a ballerina, and the other girl wanted her to play ball with her, and she didn't want to. And then the mother came out and asked which one had let the dog in. And then they pointed to each other. And then the mother told them that they would have to clean it up by dinner. And so then the girl that just wanted to be a ballerina, she asked whether the other, her sister, whether she wanted to play ball. And the sister said, 'I never thought you would ask.' So they played ball. And the ball got thrown under their barn. And when the girl went to see it, she saw a box. And so she called her sister over there. And they read all the letters. And then the last one supposed he

died in the war when the Germans attacked. They thought that it could be their greatest-grandfather."

Appendix B

An example from a subject in the entertaining, no-stopping treatment was:

Entertaining, no-stopping: "They found the box, found a box of something of this one guy. They opened it up and started reading all the stuff in it and trying to figure out who the guy was. He went to fight against the Germans or something."

An example from an educational, stopping subject was:

"These two girls were playing, and the ball went under the barn, and they found this metal box by the ball under the barn. What happened was it was full of all these letters and all this war stuff. The letters were from a guy called Harrison. He was in the war between the French and the Germans. Everything, and he was writing to Virginia Benson. He must have wrote her and so then what happened was he was one of the people that flew. He was all confused. He shot a German down from the air and he was just real confused. He didn't really know, at first he wanted to go to war, but then he didn't really want to. Some of the letters they just dropped, and it didn't really tell you that much. Then he was writing the last letter that they were reading, the girls and the mother, and there was a medal on it. He had gotten that from the French. But then they heard, there were a lot of men being killed, and they didn't really, they got about 5 kilometers and they wanted to get 20 kilometers. They didn't, they got 5, and that wasn't, they weren't doing too well. So then he was writing this letter and he had just received the medal. All of a sudden, the Germans were coming. And earlier in the story he had gotten the medal from the French and he was writing that, and he just left the medal there with the letter that he had written. It wasn't closed up or anything. At the end of that letter it said, "Now I know the terrible secret." Then it was finished and it sort of, it just let you go, it didn't really tell you what had really happened. I think he, at first, he wanted to go to war because he didn't really know what the war was about. Then he, when he found out he didn't really want to go."